

# INTERNATIONAL SEARCH REPORT

national Application No  
PCT/GB2005/000496

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C07C221/00 C07C225/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BEILSTEIN Data, WPI Data, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 320 063 B1 (DENNY WILLIAM ALEXANDER ET AL) 20 November 2001 (2001-11-20) the whole document	1-12
X	LEE H H ET AL: "A LARGE-SCALE SYNTHESIS OF THE BIOREDUCTIVE DRUG 1,4-BIS{ '2-(DIMETHYL-AMINO)ETHYL-AMINO }-5, 8-DIHYDROXYANTHRACENE-9,10- DIONE BIS-N-OXIDE (AQ4N)" JOURNAL OF THE CHEMICAL SOCIETY, PERKIN TRANSACTIONS 1, CHEMICAL SOCIETY. LETCHWORTH, GB, no. 19, 1999, pages 2755-2758, XP009049380 ISSN: 0300-922X *pages 2755, 2757 and 2758*	1-12

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

18 August 2005

Date of mailing of the international search report

29. 08. 2005

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 03/078387 A (BTG INTERNATIONAL LIMITED; DENNY, WILLIAM, ALEXANDER; PATTERSON, LAURE) 25 September 2003 (2003-09-25) the whole document</p> <p>-----</p>	1-12

# INTERNATIONAL SEARCH REPORT

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PCT/GB2005/000496

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7

Process for the preparation of compound AQ4N (2) or a salt or solvate thereof wherein the process includes the oxidation of a compound AQ4 (1) with an oxidising agent at a reaction temperature not exceeding 10°C.

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2. claims: 8-11

Process for the preparation of AQ4N (2) comprising the conversion of p-hydroquinone (4) and 3,6-difluorophthalic anhydride (DFPA, 5) into 1,4-difluoro-5,8-dihydroxyanthracene (DDA, 6) in a stirrable solvent at a temperature not exceeding 200°C.

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3. claim: 12

Process for the preparation of AQ4N(2) including the conversion of 1,4-difluoro-5,8-dihydroxyanthracene (DDA, 6) into AQ4(1) wherein the reaction solution in which the conversion takes place is treated with an ammonium hydroxide and brine solution cooled to 0°C.

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national Application No  
T/GB2005/000496

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6320063	B1	20-11-2001	AT 277887 T	15-10-2004
			CA 2337070 A1	03-02-2000
			DE 69920708 D1	04-11-2004
			EP 1097125 A1	09-05-2001
			ES 2226411 T3	16-03-2005
			WO 0005194 A1	03-02-2000
			JP 2002521357 T	16-07-2002
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WO 03078387	A	25-09-2003	AU 2003212534 A1	29-09-2003
			CA 2478867 A1	25-09-2003
			EP 1485349 A1	15-12-2004
			WO 03078387 A1	25-09-2003
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